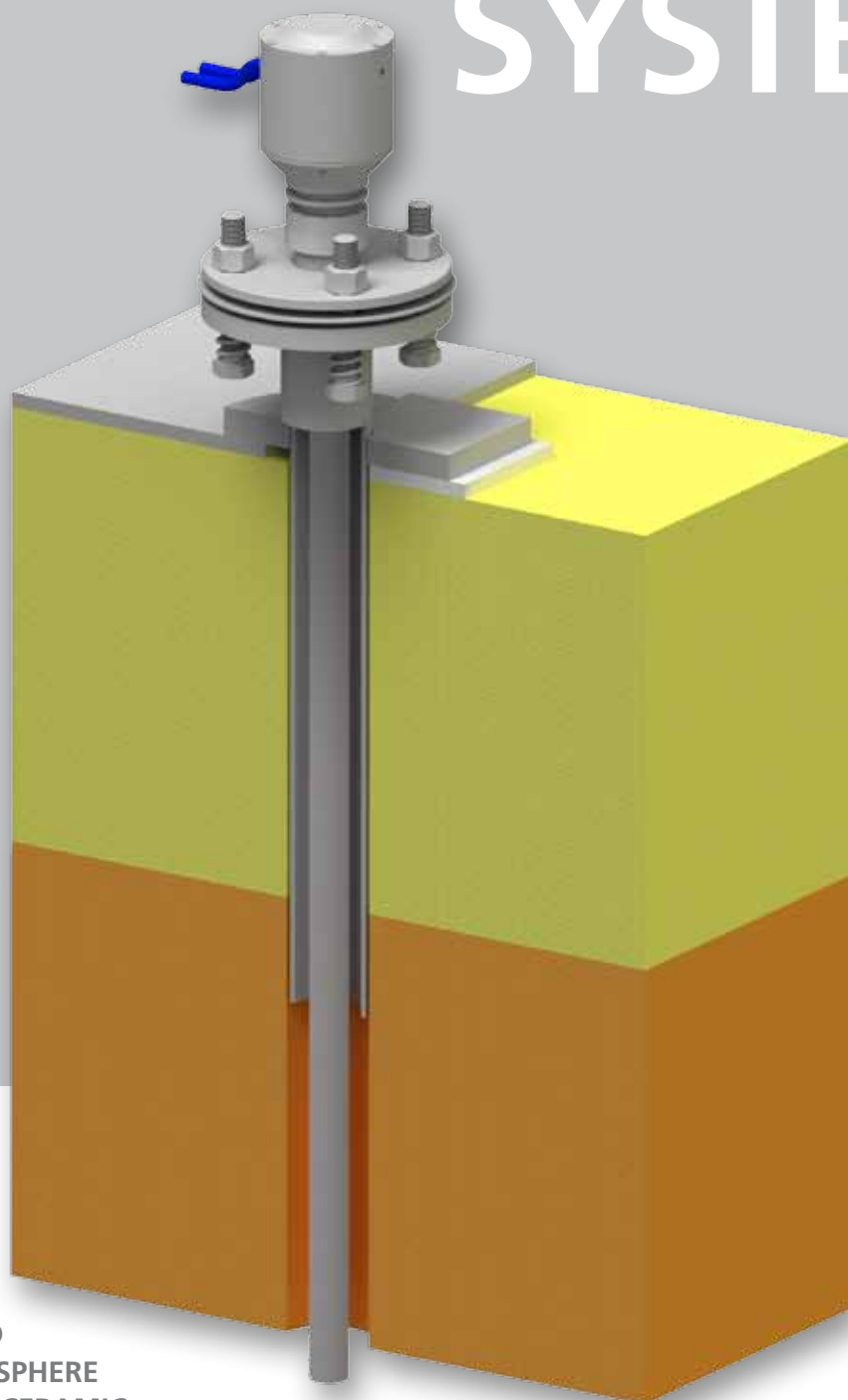


OXYGEN MEASURING SYSTEMS



EXHAUST GAS AND
PROTECTIVE ATMOSPHERE
CONTROL FOR THE CERAMIC,
GLASS AND METAL INDUSTRIES

A MEMBER OF THE **HORN** GROUP

euRox

OXYGEN MEASURING SYSTEMS

EUROX Sauerstoff Mess-Systeme GmbH is a specialist with more than 25 years of experiences in the production of oxygen measurement systems based on zirconia measuring cells.

When it comes to direct measuring of flue or process gases up to a temperature of 1500°C or measuring protective gases with extractive oxygen sensors heated up to 900 °C,

you can rely on EUROX.

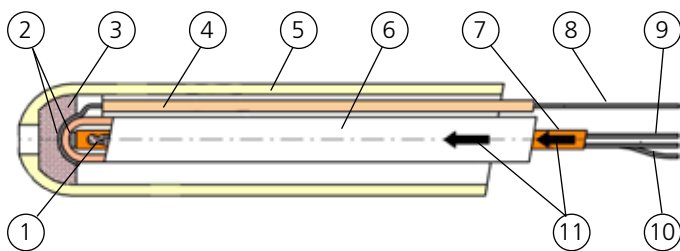
All measuring cells are protected by a **patented, active ceramic diffusion block** and fitted with spring-loaded solid electrodes for total reliability. In this way chemical attacks are significantly reduced and the platinum volatilization at reducing atmospheres is brought under control.

EUROX DIRECT INSERTED OXYGEN SENSOR

OXYGEN SENSOR *DiRox 1500-dipro*

The oxygen sensors *DiRox 1500-dipro* measure oxygen content in exhaust or process gases up to 1500 °C.

Successfully tested under harshest thermal and chemical conditions in the glass industries (where this high temperature oxygen sensor shows outstanding performance over several years) makes it ideal for the application in the ceramic or heat treatment industries.



- | | |
|--|--|
| 1. Thermocouple embedded with a special cement | 7. Capillary tube for inside electrode, thermocouple and reference air |
| 2. Pressed-on solid electrodes | 8. Pt-wire outside electrode |
| 3. Active ceramic diffusion block | 9. Pt-wire inside electrode |
| 4. Insulating tube | 10. Thermocouple |
| 5. External protection tube | 11. Compressive forces for electrode attachments |
| 6. ZrO ₂ tube | |

The outer platinum electrode is separated from the measuring gas by a permeable, patented active ceramic diffusion block. This offers the measuring cell the best possible protection against attacks, even at high chemical attacks and thermal load of the exhaust gas, and prevents any danger of sooting or platinum volatilization.



Eurox Oxygen-Sensor *DiRox 1500-dipro*

EUROX offers the only high temperature oxygen sensors with solid platinum (Pt) electrodes, continuously pressed on by compression springs. Furthermore, solid electrodes made of a special chemical resistant platinum alloy (in stead of volatile platinum pastes), allow continuous operation even at reducing atmospheres.

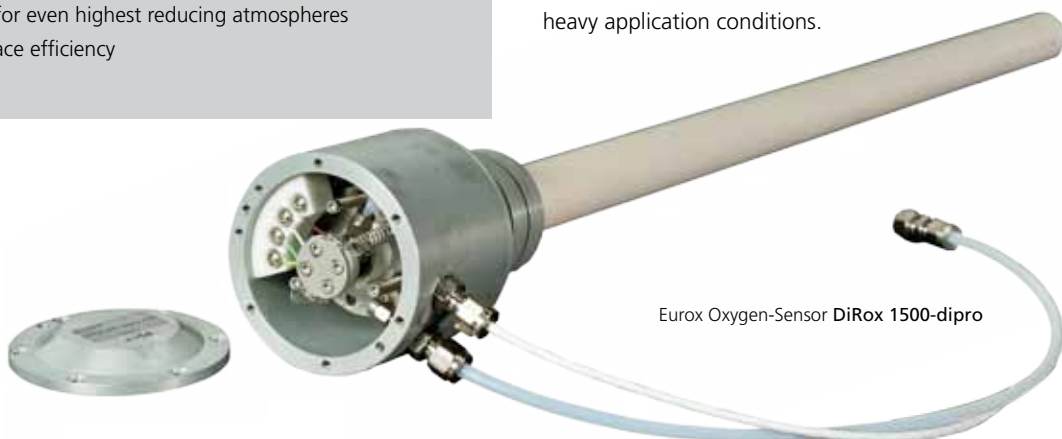
The internal thermocouple is embedded in cement specially developed by EUROX. This prevents its volatilization by uncontrolled high reference airflows.

The *DiRox 1500-dipro* is fitted with a second protection tube for heavy application conditions.



Benefits:

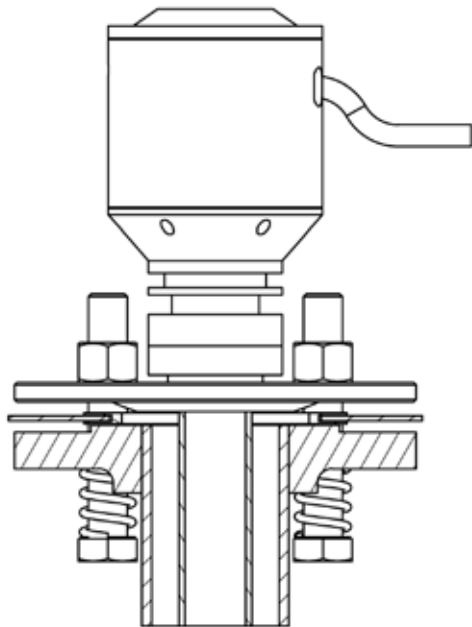
- monolithic gas-tight zirconium (ZrO₂) tube
- patented active ceramic diffusion block for utmost cell protection
- embedded thermocouples avoids its volatilization
- solid electrode uniquely attached by spring forces up to 1500 °C
- no danger of sooting or platinum volatilization
- most suitable for even highest reducing atmospheres
- increases furnace efficiency



Eurox Oxygen-Sensor *DiRox 1500-dipro*

FLANGE CONNECTION

EUROX has developed a special flange system fitted with one ball-shaped face and spring loaded screwed fastening. This assures fast, safe and gastight installation without any danger of damage to the brittle ceramic protection tubes even if the counter flanges are some-



Flange connection

what out of right angles or at narrow mounting holes. A high duty FPM gasket in combination with springs allows for operating temperatures of up to 200 °C.



Installed sensor with flange EUROX connection

REFERENCE AIR SUPPLIES

A suitable supply of reference air to the oxygen sensors is of utmost importance for their lifespan as well as the accuracy of the oxygen-readings. Uncontrolled reference airflows may lead to a premature drop-out within only a few months.

Inserted air is used as the reference gas and the zirconium cell's measuring principle is based on the comparison of oxygen content of the measuring gas with that of the reference gas. Air with a constant oxygen content of 20,9% is commonly used as reference gas.

To ensure correct sensor operation, EUROX has developed a reference air unit with several sophisticated features to increase the operational reliability and to keep maintenance requirements at a minimum. For example EUROX developed the unique "air pulsing unit" for a con-

tinuous, stable dosage of air between approx. 0.3 and 2.0 l/h. This ensures efficient operation over many years and a vastly increased filter life-span.



Benefits:

- high pressure and suction power by a double diaphragm pump
- operating stabilized by a control valve
- unique „air pulsing unit“ assures even lowest flow rates constant over years
- multiple increased filter life reduces maintenance requirements
- 2 filters: a fine filter (99,99% / > 0,1µm) and an activated carbon filter
- pressure alarm switch (wired to a potential-free relay)



Reference Air Unit with pressure control valve and Air Pulsing Unit

EUROX EXTRACTIVE AND HEATED OXYGEN SENSOR

OXYGEN SENSOR *EpRox 900-FL*

for continuous analysis of dry process gases (e.g. N₂-H₂)

The zirconium measuring cell with very stable gas extraction facilities is heated to an exceptionally high temperature of 900 °C to assure complete catalytic transformations and very short reaction times. It is designed for rugged, industrial application.

A permeable, patented active ceramic diffusion block offers full protection for the measuring cell against attacks by harmful components of the process gases. In addition, it features electrodes made of a special platinum-alloy with high chemical resistance pressed onto the zirconia tube by spring forces to avoid its detachments.

The design of the measuring chamber prohibits sooting – even at continuous operation at highly reducing atmospheres.

The unique design of the measuring cell and its heating facility produces oxygen values strictly according the Nernst Equation and thus enables the calculation of data based on thermodynamic laws with no need for calibration (e.g. the dew-point temperature).

The very short reaction time of the sensor $t_{95} = < 15 \dots 30$ sec. from air \rightarrow N₂ (including the time of the measuring gas passing through the internal flow line) allows switch-over times of only 2 minutes and thereby the multiple collection of up to 10 sampling points. For this purpose the unit is equipped with a modular solenoid valve block to collect the samples. This allows representative atmosphere monitoring over a long furnaces with the use of only one measuring unit e.g. to find out in which part there may be leakage. If further values like the dew-point temperature are required they can be calculated consequentially from the measured oxygen values without installing the conventional, numerous dew point analysers (which have a very slow response time, e.g. T₉₅ = 2 hours).

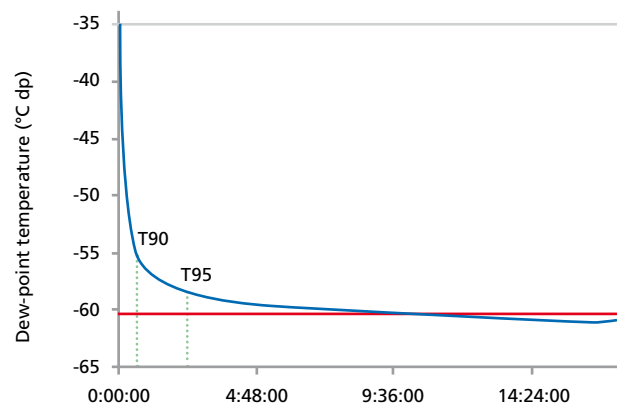


Benefits:

- exceptionally high measuring cell temperature of 900 °C
- patented, active ceramic diffusion block offers maximum chemical resistance
- unique non-detachable platinum electrodes pressed on by spring forces
- very short reaction time ($t_{95} = < 15 \dots 30$ sec. from Air \rightarrow N₂)
- true "NERNST-behavior" and complete catalytic transformations
- easy calculation of derived values such as dew-point temperature
- unrivalled, fast dew point measurement
- highest measuring accuracy and long-term stability
- minimum maintenance service required



Solenoid valve blocks



Typical response time of dew-point transmitters (e.g. from +10 to -60 °C dp) T₉₅ is approx. 2 hours. In comparison, the EUROX oxygen sensor offers a T₉₅ = approx. 15 .. 30 Sec // Air to N₂(5.0).



euRox
OXYGEN MEASURING SYSTEMS